

Seasonal Occurrence and Spatial Distribution of Some Latridiid Species (Coleoptera, Latridiidae) on the Kakuma Hills, Kanazawa, Japan

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Abstract Occurrence of three latridiid species was surveyed in three kinds of vegetation layers (herb, shrub and tree layers) along a line census route in a hilly area of Kanazawa, Central Japan. Of all the beetles obtained, latridiids were represented by 47 individuals (1.0% of all coleopteran individuals) distributed into three genera and three species, *Melanophthalma japonica* JOHNSON (38 individuals), *Stephostethus pandellei* BRIS. DE BARNEVILLE (8 individuals) and *Corticicara gibbosa* (HERBERT) (1 individual). *Melanophthalma japonica* appeared from May to September almost continuously with four peaks of abundance (early and late May, late July and middle September; the highest in late May), while *S. pandellei* appeared only in the spring (April and May) and in September with two peaks of abundance (late May and middle September; the highest in late May). *Melanophthalma japonica* occurred widely in the tree layer across the slope and the top of the hilly area, both of which were covered with secondary forests, while *S. pandellei* was mostly restricted to the shrub layer at the bottom of the hills.

Introduction

The family Latridiidae (Coleoptera, Cucujoidea) consists of about 700 species worldwide (HISAMATSU & TANAKA, 1985), of which 30 species have been recorded from Japan (SASAJI, 1989). All species in the family are small beetles with body lengths ranging from 0.8 to 3.0 mm. Latridiids feed on spores of various fungi and have been found in leaf litter (LAWRENCE & BRITTON, 1991), decaying vegetation (HISAMATSU & TANAKA, 1985; LAWRENCE, 1991), rotting seaweed (CHANDLER, 1983),

animal nests (LAWRENCE, 1991) and human habitation (LAWRENCE, 1991) such as cellars and granaries (HISAMATSU & TANAKA, 1985; LAWRENCE, 1991).

Some species are known to live on leaves (LAWRENCE, 1991; LAWRENCE & BRITTON, 1991) and flowers (LAWRENCE & BRITTON, 1991; BORROR *et al.*, 1981) of living plants and are believed to feed on mildew (LAWRENCE, 1991). These species can be collected by canopy fogging (*e.g.*, DAVIES *et al.*, 1997; GUILBERT, 1997; WAGNER, 1997) and beating (LAWRENCE & BRITTON, 1991) and possibly by net sweeping (LAWRENCE, 1991). However, there has been no record of latridiids on living plants in Japan, and overall few data are available about the spatial and temporal patterns of these beetles.

We conducted a faunal survey of coleopteran insects living on foliage using net sweeping in a hilly area of Central Japan, during which we collected three latridiids. In this paper, ecological aspects of these three species are reported with special reference to faunal composition, spatial distribution and seasonal occurrence.

Method

1. Study site

The study site was situated on the Kakuma hills (50–160 m a.s.l.) around Kanazawa University in Kanazawa, Japan (36°32'N, 136°42'E) (Fig. 1). A route (240 m in length) for a line census was established in the site. The route was divided into 13 sections ranging from 15 to 21 m in length, based on four environmental conditions: vegetation, position on the hills (bottom, slope or top), humidity and light condition (Table 1). Sections 1 to 6 were situated at the bottom of the hills and were covered mainly by grassland (*Poaceae* spp., *Persicaria thunbergii*, and *Artemisia* sp.) and partly by alder trees (*Alnus japonica*), since paddy fields were abandoned a few decades ago (TAKADA, 1999). Sections 7 and 8 were in secondary forests located on the slope of the hills and dominated partly by Japanese oaks (*Quercus variabilis* and *Q. serrata*) and *Eurya japonica*. Sections 10 to 13 on the top of the hills were also in secondary forests and dominated by Japanese oak (*Q. serrata*), red pine (*Pinus densiflora*) and Japanese cedar (*Cryptomeria japonica*). Of these six sections in forests, section 13 included some gaps due to the death of pine trees. Section 9 was established in forest gaps with dense shrubs and vines composed mainly of kudu (*Pueraria lobata*).

2. Sampling method

Each section was sampled by net sweeping along the route in an order from sections 1 to 13 (Fig. 1). The net had a 50 cm diameter hoop with a nylon mesh bag and was fitted to a 1.5 m stick that could be lengthened to 5.4 m. Samples were taken from three different vegetation layers (herb: 0–0.5 m, shrub: 0.5–1.5 m, tree: 1.5–7.1 m high) on the right and left sides of the route in each section. For the herb layer, assemblage of the Japanese pampas grass (*Miscanthus* sp.) was not swept. The shrub layer included bamboo grass (*Sasa* sp.) and the foliage of low trees and vines twining around some

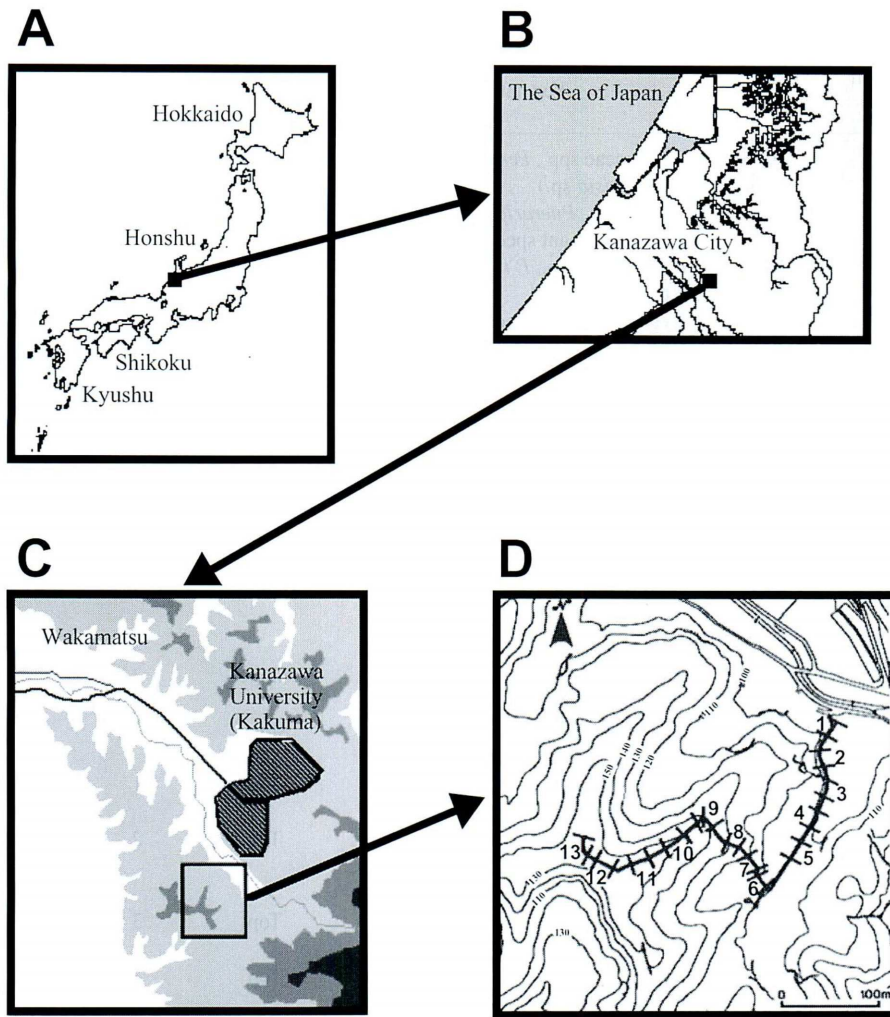


Fig. 1. Map showing the location of Kanazawa City (A), Kakuma Campus of Kanazawa University (B), the study site (C) and the study route (D).

trees and shrubs. In sections 3 to 5, however, the assemblage of the Japanese pampas grass dominated this layer. The tree layer consisted of the foliage of trees and vines. The total number of sweeps in a census differed among sections and vegetation layers according to plant biomass (Table 2). The survey was conducted from 21 April to 20 October in 1997 at ca. 10-day intervals, resulting in 17 sampling events in total. Each sampling was started between 9 and 10 AM and finished between 2 and 3 PM. All coleopteran insects in the samples were identified to species and counted, and the latridiid specimens were deposited in the collections of Kanazawa University and Kyushu University.

Table 1. Features of sampling sections along the study route in Kakuma, Kanazawa.

Section No	Length (m)	Vegetation ¹⁾	Position on the hill	Humidity ²⁾	Light condition ³⁾
1	20	H (Poaceae spp., <i>Persicaria thunbergii</i> , <i>Artemisia</i> sp.) S (<i>Sasa</i> sp., <i>Pueraria lobata</i>) T (No dominant species)	Bottom	2	4
2	18	H (Poaceae spp., <i>P. thunbergii</i> , <i>A.</i> sp.) S (<i>S.</i> sp.) T (No dominant species)	Bottom	3	4
3	20	H (Poaceae spp., <i>P. thunbergii</i> , <i>A.</i> sp.) S (<i>Miscanthus</i> sp.) T (<i>Weigela hortensis</i> , <i>P. lobata</i>)	Bottom	3	5
4	17.5	H (Poaceae spp., <i>P. thunbergii</i>) S (<i>M.</i> sp.) T (<i>Alnus japonica</i>)	Bottom	5	5
5	19.5	H (Poaceae spp., <i>P. thunbergii</i> , <i>A.</i> sp.) S (<i>M.</i> sp.) T (<i>A. japonica</i>)	Bottom	4	4
6	17.5	H (<i>P. thunbergii</i>) S (<i>S.</i> sp.) T (<i>A. japonica</i>)	Bottom	4	3
7	16	S (<i>Eurya japonica</i>) T (<i>Quercus variabilis</i>)	Slope	3	3
8	17.5	S (No dominant species) T (No dominant species)	Slope	2	3
9 ⁴⁾	15	H (<i>M.</i> sp.) S (<i>P. lobata</i> and others)	Slope	1	5
10	21	S (<i>S.</i> sp., <i>E. japonica</i>) T (<i>Quercus serrata</i> , <i>Pinus densiflora</i> , <i>Cryptomeria japonica</i>)	Top	2	3
11	21	S (<i>E. japonica</i> , <i>Callicarpa japonica</i>) T (<i>C. japonica</i>)	Top	3	1
12	20	S (<i>S.</i> sp.) T (<i>Q. serrata</i> , <i>Styrax japonica</i>)	Top	3	3
13	20	S (<i>P. lobata</i> and others) T (<i>P. densiflora</i> , <i>P. lobata</i> and others)	Top	2	4

1) Dominant species in each of three vegetation layers (H: Herb, S: Shrub, T: Tree).

2) Arbitrary ranking: Dry (1)–Wet (5).

3) Arbitrary ranking: Dark (1)–Light (5).

4) Forest gap.

Results and Discussion

1. Latridiid species collected from foliage

A total of 4731 coleopteran individuals belonging to 45 families and 351 species were collected in this survey. Of these beetles, latridiids were represented by 47 indi-

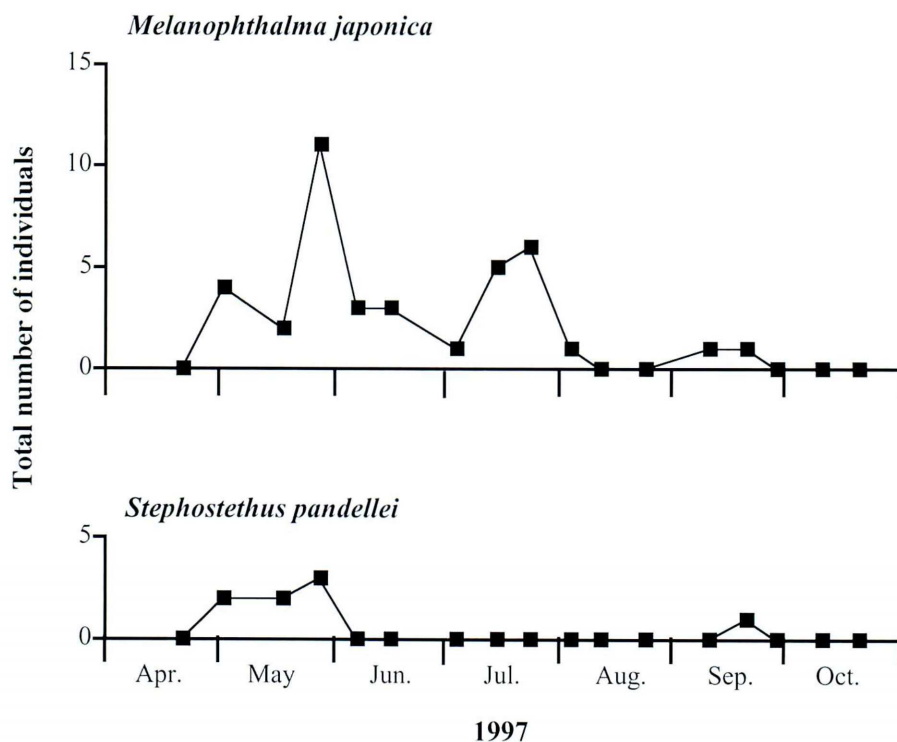


Fig. 2. Seasonal patterns in both numbers of individuals of two latridiid species, *Melanophthalma japonica* and *Stephostethus pandellei*, collected by sweeping in Kakuma, Kanazawa, Japan.

viduals (1.0% of all individuals) distributed among three genera and three species (0.9% of all species). These three species were *Melanophthalma japonica* JOHNSON (38 individuals), *Stephostethus pandellei* BRIS. DE BARNEVILLE (8 individuals) and *Cortinicara gibbosa* (HERBERT) (1 individual) (Table 2). The results showed that latridiids represented the minor part of the coleopteran community on foliage in terms of both numbers of species and individuals. For other sampling methods, DAVIES *et al.* (1997) reported that 13 species (1.3% of all species) and 172 individuals (2.8% of all individuals) of latridiids were included in their coleopteran samples obtained by canopy fogging in Venezuela. As these articles and this study indicate, latridiids probably play a minor role in foliage-dwelling coleopteran communities.

In this study, *M. japonica* was collected in relatively large number of individuals compared to the other two species and it may utilize foliage as one of its main habitats. On the other hand, the individual numbers of *S. pandellei* and *C. gibbosa* were very small. PEEZ (1967) reported that in Europe, *S. pandellei* was collected especially from barks and stumps of coniferous trees immediately after cutting. *Cortinicara gibbosa* is known to be found in dead branches (HISAMATSU & TANAKA, 1985). The low individual numbers of these two species collected by net sweeping from foliage may be due to

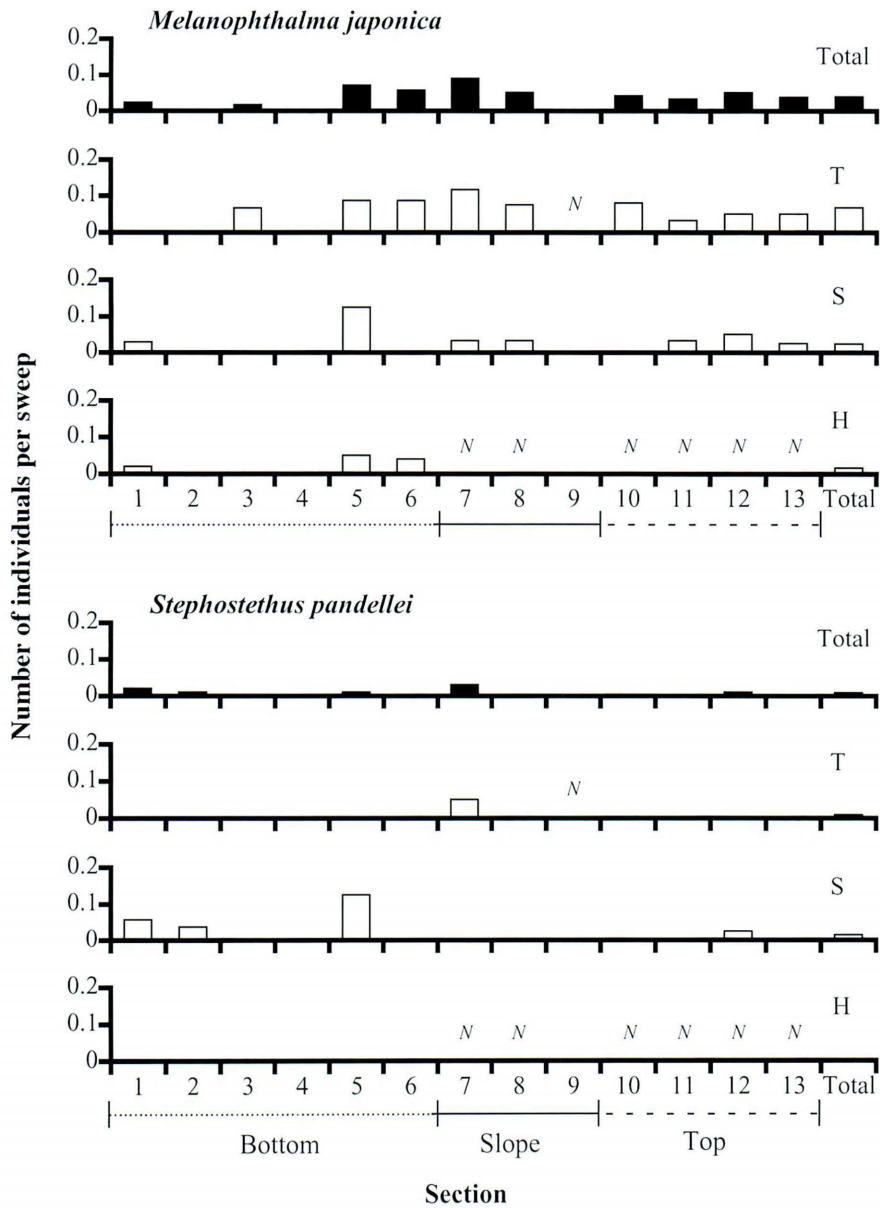


Fig. 3. Distribution of both mean numbers of individuals of two latridiid species, *Melanophthalma japonica* and *Stephostethus pandellei*, collected per sweep across three vegetation layers (T: tree, S: shrub, H: herb) and 13 sampling sections. Lines below the section numbers indicate the position of the hills (solid line: slope; broken line: top; dotted line: bottom). N indicates that no samples were collected.

their preferences for resources other than living plants.

2. Seasonal occurrence

Seasonal patterns in the individual numbers of *M. japonica* and *S. pandellei* are shown in Fig. 2. *Melanophthalma japonica* was collected from the beginning of May until mid-September except for the latter half of August. The largest peak occurred on 28 May, and other peaks on 2 May and 15 July. In contrast, *S. pandellei* was collected only in May and mid-September. The largest peak occurred on the same date, 28 May, as that of *M. japonica*.

3. Spatial distribution

Table 2 and Figure 3 show the spatial distributions of *M. japonica* and *S. pandellei* across the 13 sections and three vegetation layers. As a whole, *M. japonica* was collected through almost all sections on the route from the bottom to the top of the hills, indicating the broad habitat range of this species. Detailed examination of the spatial distribution revealed that the number collected was constantly high at the tree layer in the slope and the top, both of which were covered by secondary forests. *Stephostethus pandellei* was mostly distributed in the sections of shrub layer at the bottom. More *S. pandellei* samples are needed to know its distribution pattern.

Acknowledgement

We thank Mr. Teruhisa UENO (Kyushu University) for identifying the latridiid species, Dr. Shin-ichi TANABE (Kanazawa University) for providing valuable comments and Mr. Masayoshi UMEBAYASHI (Kanazawa University) for drawing the map. This research was partly carried out by Hakusan Nature Conservation Fund, Ishikawa Prefecture.

要 約

高田兼太・高羽正治・中村浩二：金沢市角間丘陵におけるヒメマキムシ科(Latridiidae)に属する3種の季節変動と空間分布パターン。—— 1. 1997年4月から10月にかけて、金沢市角間丘陵にある金沢大学角間キャンパス周辺の二次林で、スウィーピング法によるラインセンサスをおこない、45科351種4731個体の甲虫をえた。そのうちヒメマキムシ科は、ヤマトケシマキムシ *Melanophthalma japonica* JOHNSON (38 個体), *Stephostethus pandellei* BRIS. DE BARNEVILLE (8 個体), ウスチャケシマキムシ *Corticinara gibbosa* (HERBERT) (1 個体)の合計3種47個体であった。

2. 得られたヒメマキムシ科のうち、ヤマトケシマキムシは5月から9月までほぼ連続して出現し、4回の個体数のピークを示した(5月末に最大のピーク)が、一方 *S. pandellei* は4月から5月に出現したのち、9月まで出現しなかった。

3. ヤマトケシマキムシは、斜面や尾根の二次林内の上層(1.5 m以上)から広範囲にわたって採集され、*S. pandellei* は生息域が狭く、限られた生息環境からのみ採集された。

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